March 2003

Policy and Practice Briefs

About These Briefs

This brief is one of a series on critical issues related to raising the quality of high schools, community colleges and adult education. Each one frames an issue, highlights promising developments and provides an overview of key data and trends.

The Economic Imperative for Improving Education

In a world where fiscal capital and technology flow freely from country to country, a nation's human capital—the knowledge and skills of its workforce—is key to its well being. When communications and transport were more primitive, nations with great stores of natural resources and other geographical advantages could often rest their economies on such inherited wealth. This is no longer true.

Today, exposed to greater competition for goods and services from abroad and with access to talented workers not limited by geography, businesses seek out capable people wherever they can be found. High-tech firms in the United States look to software developers in India and well-educated office workers in Ireland, while British firms interested in establishing market leadership in biotechnology recruit American scientists. At the same time, production processes that require workers with only modest knowledge and skill often move to countries where labor is cheaper and distance to market is not a factor.

Some American industries that must remain close to their customers, such as hospitality, retail and transport, continue to need large numbers of modestly skilled workers. But many others are shifting the location of production. For example, the textile industry, which used to be one of the largest employers of American workers, has largely disappeared in this country. Steel manufacturing and shipbuilding are other examples of prominent industries that have moved production abroad. This is one tangible effect of mobile capital and technology and a radically different standard of living for many overseas workers, who are eager to accept wages that American workers would consider inadequate.

This brief is organized around two broad concerns: the nature of the challenge these new conditions place on the American workforce, especially the demands they imply for a far better educated workforce than the nation has required in its first 200 years, and the current performance of our high schools in relation to this new set of expectations.

Developing Knowledge Workers

It is not just the expansion of international trade that is responsible for the high demand for skilled workers. The nature of work itself is changing.

Advances in technology have boosted productivity and allowed manufacturers to run their factories with fewer workers. At the same time, these changes have increased the requirements for frontline workers. Gone are

the days when workers in a plant focused on one rote task, leaving all the thinking and decision making to managers. Today's flexible manufacturing systems rely on people who can handle multiple tasks, interact well with their colleagues, respond to varying customer needs, identify problems and make quick decisions about how to fix them. Similar workplace trends, brought on in part by advances in computing and communications, have likewise transformed the financial services and insurance industries.

In this new environment, the most successful companies often are those able to get new products from the drawing board to market quickly, respond to competitors almost overnight, keep inventory levels to a minimum, and wring every ounce of efficiency out of production and service systems. The marketplace increasingly provides companies with incentives to be as lean and flexible as possible and to adopt policies that attract and hold highly capable workers who enable the firm to function as an organization that is constantly learning.

Firms that operate in this mode seek employees whom management expert Peter Drucker calls "knowledge workers":

> *"…the new jobs require, in the great majority, qualifications the blue-collar worker does not possess and is poorly equipped to acquire. The new jobs require a good deal of formal education and the ability to acquire and to apply theoretical and analytical knowledge. They require a different approach to work and a different mind-set. Above all, they require a habit of continual learning."*

Admittedly, not every workplace demands such individuals. Telephone operators, for example, have seen their jobs "de-skilled." Others, such as baggage handlers and taxi drivers, are not expected to see their job requirements change much at all. Still, the changing shape of the labor market is expected to continue to favor those not just with stronger education credentials but the ability to creatively apply advanced knowledge and skills to problems they may never have seen in school. This reality is borne out in the latest projections from the U.S Department of Labor, which identify the fastest growing jobs from 2000 to 2010 (Figure 1).

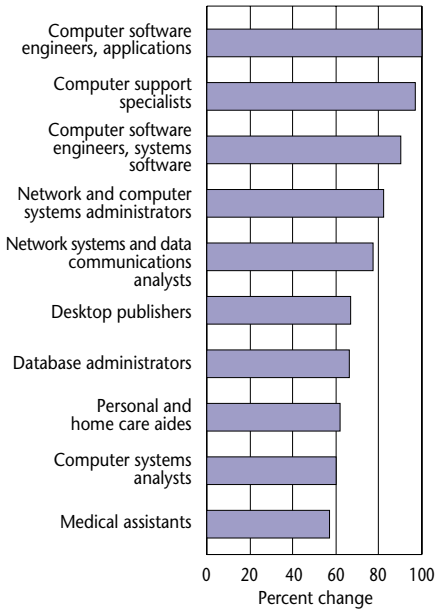
Eight of the ten occupations listed in Figure 1 require some form of postsecondary education, and this trend will continue. According to Labor Department projections, jobs requiring postsecondary education will experience above-average growth, while those requiring only on-the-job training or work experience will grow at less than the expected 15 percent average projected by the Bureau of Labor Statistics in the first decade of the new millennium. Although such noncollege jobs will continue to make up a large share of the labor market, they will pay much less than the jobs that require a college credential (Figure 2).

These requirements for more skilled workers continue a shift in education requirements that has been evolving for quite some time. In 1997, 53 percent of employers reported that the skills required to complete production or support jobs at an acceptable level increased in the previous three years. Only 6 percent indicated that skill requirements were declining.[1]

Figure 1

Fastest Growing Occupations

Percentage change in employment in the ten occupations projected to grow fastest, 2000–2010

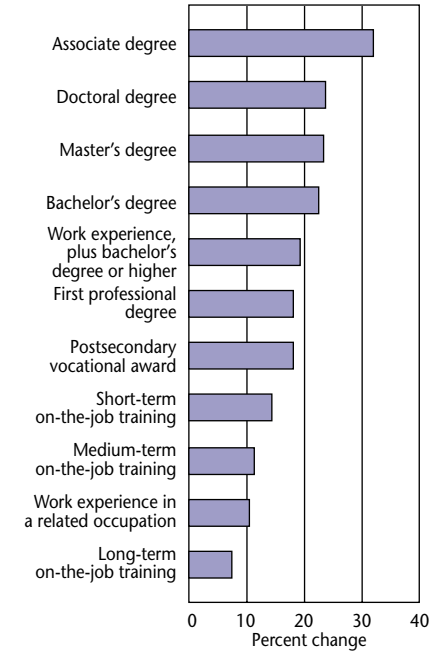


SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, 2000–2010 Employment Projections, 2001.

Figure 2

Job Growth Tied to Postsecondary Education

Percentage change in number of jobs by most significant source of education or training, projected 2000–2010



SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Tomorrow's Jobs, Bulletin 2540-1, 2002.

While self-interest alone should fuel students' commitment to gaining a first-class education, there are several societal interests that point in the same direction. In addition to the competitiveness of American enterprises in the global marketplace, the changing nature of our demography places increasing importance on the earning power of each member of the American workforce. In 1950 there were 7.3 adults of working age (24-64) for every one that reached retirement age (65 and over). Today this ratio is 4.7, and by 2030, when most of the baby boom generation will have retired, the best estimates are that it will have declined to 2.8.[2] With more and more retirees each depending on fewer people in the workforce to power the economy, the nation can ill afford to have many individuals of working age unqualified to command decent wages in the global marketplace.

Higher Learning, Higher Earning

Greater educational achievement has long been linked to greater income. In recent years, however, the gap between those who have more education and those who have less has grown (Figure 3).

Normally the availability of more skilled workers, as has been the case in recent years, would allow employers to moderate, if not lower, their wages. That this has not occurred, even as the percentage of college-educated Americans has grown, is a clear indication that the demand for higher skills in the United States continues to exceed the supply.

The relationship between education and income for working men and women 25 years old and over is abundantly clear (Figure 4) and even more pronounced among young adults ages 25-34. For example, in 2000, male and female college graduates earned 60 and 95 percent more, respectively, than those who had not gone beyond high school or a GED. High school dropouts face even more difficult circumstances, as they earn 27 and 30 percent less than their male and female counterparts who completed only high school or a GED.[3]

Statistics from the U.S. Department of Labor underscore this point: of the 50 best-paying occupations in the country, only two (air traffic controllers and nuclear power reactor operators) do not require a college degree.[4]

Given the changing nature of work, the shift in demographics, and the economic rewards that flow to well-educated individuals and the companies fortunate enough to employ them, it is critical to the well-being of the nation that U.S. high schools rise to the challenge of preparing all students for this new economic reality.

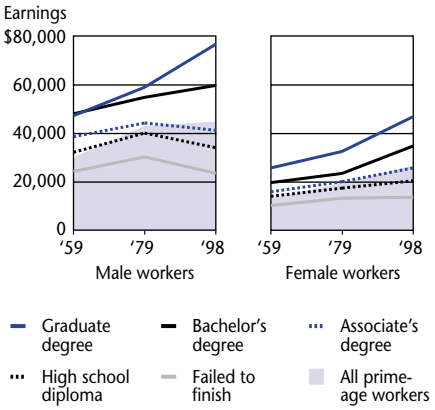
Are U.S. Students Prepared?

In the old economy (prior to the mid-1970s), it was sufficient to provide an excellent education to a small elite group of students and a basic education to the rest of the population. This approach is out of step with today's knowledge economy and a disservice to most of our youth, all of whom need a firm grounding in core academics. However, change has come slowly to schools, and high schools are no exception. While many states have begun to address these new requirements by setting higher standards for all students, keeping a careful eye on students' progress and investing in professional

Figure 3

Earnings Depend Increasingly on Educational Attainment

Earnings of prime age (30–59 years old) workers in 2000 dollars

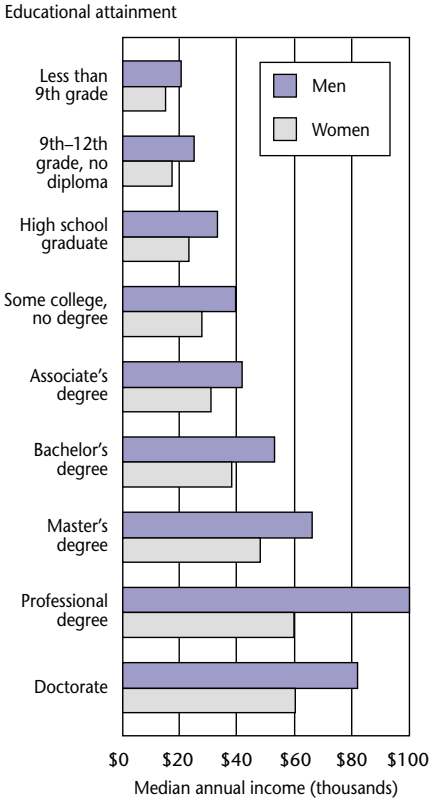


SOURCE: Carnevale, A.P., and Desrochers, D.M. (2002). The Missing Middle: Aligning Education and the Knowledge Economy. Princeton, N.J.: Educational Testing Service.

Figure 4

Income and Education

Median annual income of year-round, full-time workers 25 years old and over, by level of education completed and sex: 1999



SOURCE: U.S. Department of Education, NCES. (2002). *Digest of Education Statistics 2001* (NCES 2002–130). Washington, D.C.

development, the available data indicates that the results to date fall far short of the nation's needs.

Academic underachievement—At a time when our nation needs to have all students performing at proficient and advanced levels, large percentages of 12th-graders perform at basic or below basic levels on the National Assessment of Educational Progress (NAEP) (Figure 5). For example, 60 percent do not reach the proficient mark in reading despite years of attention to literacy issues. In writing that figure is 79 percent, in mathematics, 83 percent, in science, 81 percent, and in civics, 74 percent. The United States also ranked near the bottom on achievement in math and science of 21 countries participating in the Third International Mathematics and Science Study (TIMSS) in 1995,[5] results little different from those achieved during earlier evaluations in the 1960s and 1980s. These are not the marks of a world-class workforce or a world-class education system.

Especially troubling is high school performance in reading, which has remained flat since 1971 despite all the efforts to improve schooling from early childhood onward. Given reading's key role as a foundation for all learning, progress here is essential. The reality is few high schools tailor their strategies for reinforcing and extending reading and reading comprehension skills to individual student needs, wrongly assuming all students have these skills by the time they leave middle school.[6]

The story in science achievement is more complicated. Although NAEP scores slumped in the 1970s, they picked up in the 1980s but then appear to have leveled off in the 1990s. In mathematics, performance followed a similar roller coaster ride in the earlier decades but actually may have improved a bit in the 1990s (Figure 6).

In spite of this modicum of good news, though, a significant and troubling achievement gap remains between white and minority students. As measured by the latest NAEP results, the gap is largest between white and black students: 26 percentage points in reading, 43 in mathematics and 40 in science. The gap is only slightly smaller between white and Hispanic students. With minorities making up a growing segment of the labor force, this gap not only poses difficult issues for social progress but is likely to have adverse economic consequences as well.

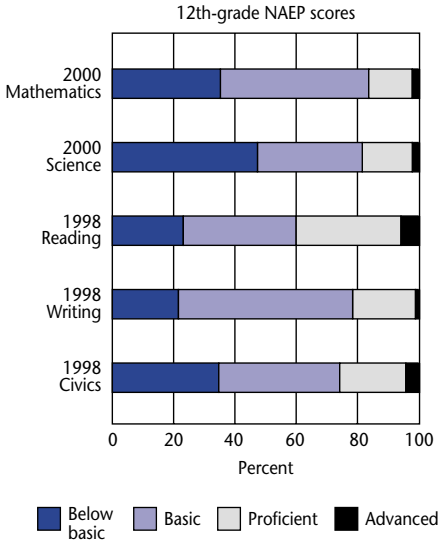
Undemanding courses—These largely disappointing test scores are consistent with the course-taking patterns of high school students. While the rigor of a student's high school curriculum is strongly associated with college success, very few students have taken the courses they need to be adequately prepared for postsecondary education. For example, 43 percent of 1998 graduates still followed the discredited "general" track, with its less than rigorous curriculum that typically falls way below the knowledge and skill requirements required to prepare for college-level work, whether at community colleges, technical colleges or four-year institutions.[7]

States have begun to address this problem by setting higher academic standards, aligning curricula with the standards, and requiring students to pass

Figure 5

NAEP Scores

Percentage distribution of the scores of 12th-graders in selected NAEP tests, by proficiency level: 1998 and 2000

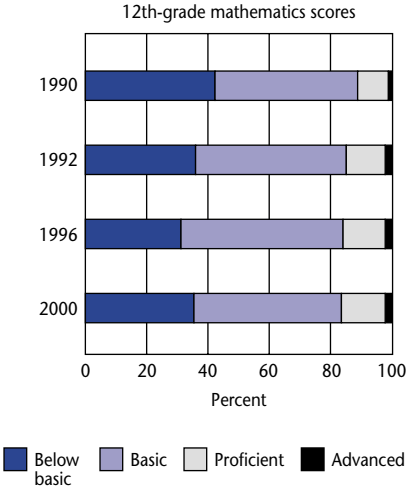


SOURCE: U.S. Department of Education, NCES. (2001). *Mathematics Highlights 2000* (NCES 2001–518); *Science Highlights 2000* (NCES 2002–452); *NAEP 1998 Reading* (NCES 1999–500); *NAEP 1998 Writing* (NCES 1999–464); and *The Next Generation of Citizens: NAEP Civics Assessments 1988 and 1998* (NCES 2001–452). Washington, D.C.

Figure 6

Mathematics Performance

12th-grade student performance on NAEP mathematics assessment: 1990–2000



SOURCE: U.S. Department of Education, NCES. (2001). *Mathematics Highlights 2000* (NCES 2001–518). Washington, D.C. Data from U.S. Department of Education, NCES. National Assessment of Educational Progress (NAEP) 1990–2000 Mathematics Assessments.

tests based on the standards before they can graduate. A few states also have begun aligning their high school graduation requirements with the expectations of colleges for freshman academic competence.

By the late 1990s, these efforts were beginning to pay off in the numbers of students taking more demanding math, science and English courses. For example, 27 percent of high school graduates completed advanced math courses such as trigonometry, precalculus and calculus in 1998 compared with 11 percent in 1982 (Advanced Levels II and III in Figure 7). At the same time, fewer students left high school having taken only algebra or plane geometry (Middle Level I in Figure 7).

Between 1982 and 1998, a slightly higher percentage of students also took advanced chemistry and physics courses. In an even more striking shift, the completion rate for Chemistry I "and/or" Physics I jumped from 26 to 52 percent.[8] In English, the percentage of high school graduates completing advanced or "honors" courses rose from 13 percent to 29 percent, but this still left 71 percent of graduates without a single advanced English course and 14 percent graduating without ever having taken an English course that was not a "below grade" general course.[9]

These trends were not limited to students in the college prep track, but affected students who chose to "major" in a vocational-technical field as well. While only 5 percent of such students completed a solid set of core academic courses in 1982, by 1998 this number had jumped to 46 percent.[10] At the same time, states have made concerted efforts to infuse more academics into vocational-technical courses, but there is little knowledge about the extent to which this has promoted curricular improvements or gains in student learning.

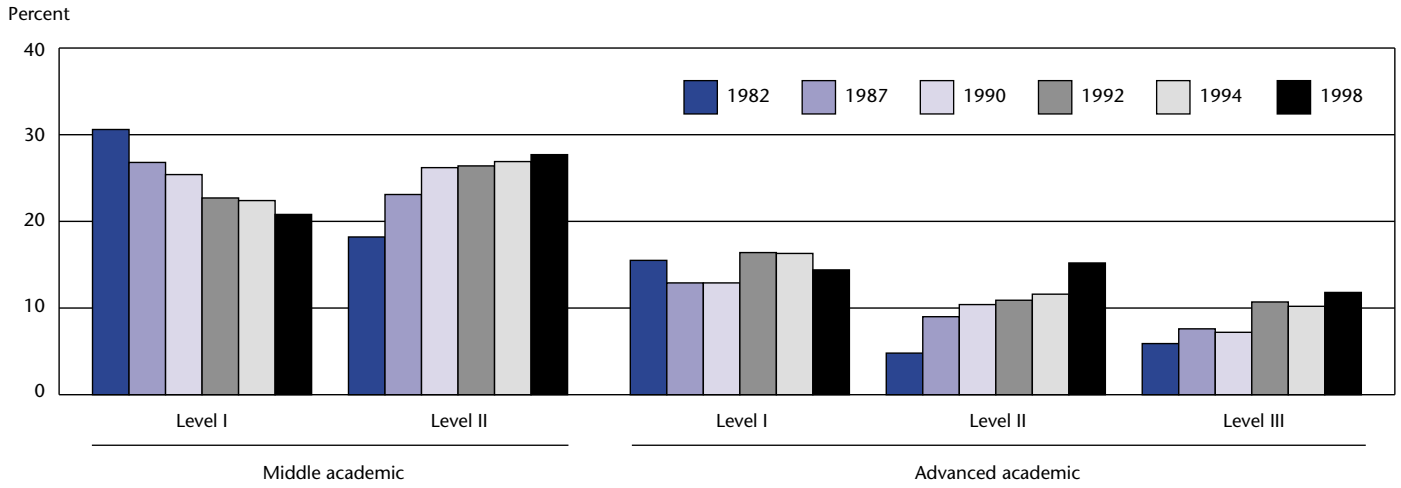
Research has shown that students who take a more demanding high school curriculum are more likely to enroll in college and stay on track to earn a postsecondary degree. Taking more rigorous courses also can help close the achievement gap between white and minority students and between students whose parents had more versus less education.[11] Although the signs of more students choosing demanding courses are encouraging, overall performance levels still indicate that the nation has a long way to go before all students leave high school prepared for college and high-skilled work.

Persistent dropout rates—Examining the performance of high school seniors tells only part of the story. Many young people never make it to or through their

Figure 7

Advanced Mathematics Course-Taking Has Increased

Percentage distribution of high school graduates according to the highest level of advanced mathematics courses taken: Selected years 1982–1998



SOURCE: U.S. Department of Education, NCES. (2000). *The Condition of Education 2000* (NCES 2000–062). Washington, D.C. Data from U.S. Department of Education, NCES. High School and Beyond Longitudinal Study of 1980 Sophomores, "Second Follow-up" (HS&B 1980/1984); National Education Longitudinal Study of 1988, "High School Transcript Study" (NELS:1992); and 1982, 1987, 1990, 1992, 1994, and 1998 National Assessment of Educational Progress (NAEP) High School Transcript Studies.

senior year. In 2000, there were 3.8 million 16–24-year-olds who were not enrolled in school and who had not yet completed a high school program.[12] The percentage of young adults ages 16-24 who are out of school and without a high school credential of any sort declined during the 1970s and 1980s but has remained at about 11 percent since 1992 (Figure 8). Here again the dropout rates of minority students, especially Hispanics (nearly 30 percent in 1999) are higher than the national average, and in many urban areas the rates are higher still.

The cost of dropping out is unacceptably high for both individual students and society at large. Dropouts face a bleak future in the labor market and also are more likely to be single parents, join the welfare rolls, or land in prison.[13] While the quality of their schooling may be only one of many reasons students drop out, it is essential to address this issue. For young people growing up in difficult circumstances, a good high school can mean the difference between a promising future and no future at all.

Unprepared for college—Because many colleges have low admission standards, or no admissions standards at all, poorly prepared students may manage to make their way through high school and into a college, only to find that they immediately need help getting up to speed in the basics. Almost one-third of new college entrants take one or more remedial courses, with 24 percent taking mathematics, 17 percent taking writing and 13 percent taking reading.[14] Some educators resist the term "remedial" because it suggests recapturing some lost knowledge. But, many new college students have never acquired this knowledge at all during high school. Some of this is not surprising as our schools typically send few clear signals to students that underperformance in high school is likely to have adverse consequences down the line.

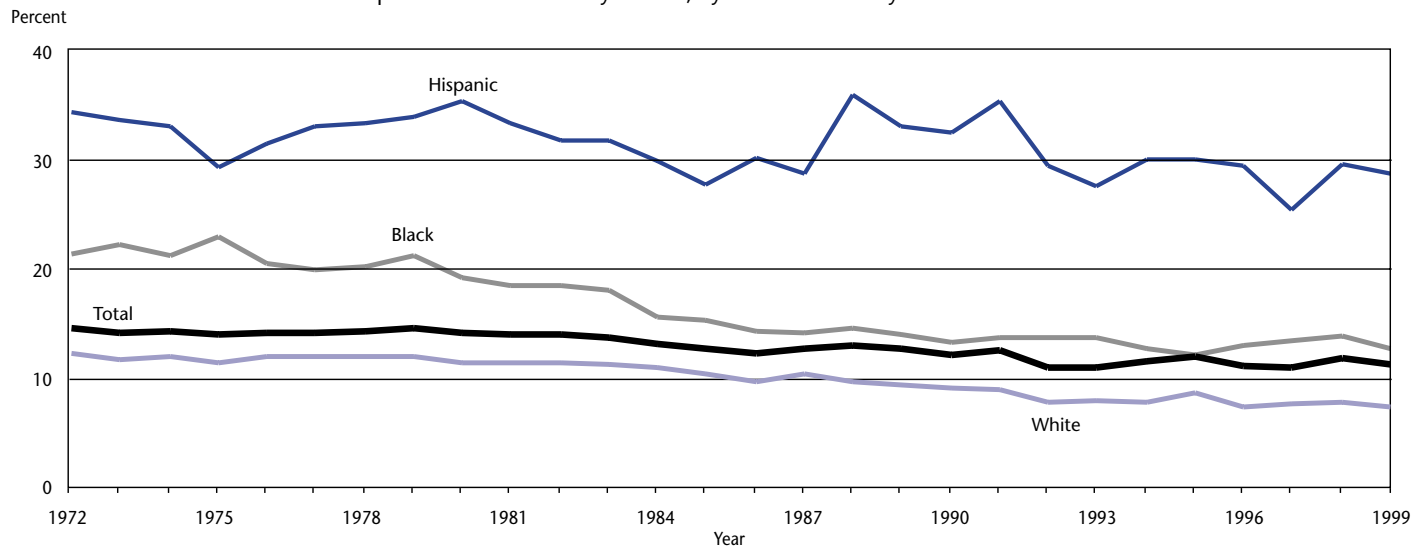
However, when gaining such basic knowledge and skills is postponed until entry into postsecondary education, students and colleges wind up spending time and money that could be devoted elsewhere and can sap a student's commitment to pursuing a college credential. With so many students entering college not prepared for its demands, it is no surprise that so many never earn a degree.

Workforce woes—American business leaders have been among the strongest advocates for school improvement. They understand that their own long-term success is tightly linked to the quality of individuals entering the labor market each year from our schools. A 2001 survey of American manufacturers by the National Association of Manufacturers highlights this industry's concern about workforce quality.[15] They report a severe skills deficit that is affecting their ability to meet customer demand. Eighty percent of responding businesses said they had a "moderate to serious" shortage of

Figure 8

Persistent Dropout Rates

Dropout rates of 16- to 24-year-olds, by race and ethnicity: October 1972–99



SOURCE: U.S. Department of Education, NCES. (2001). *The Condition of Education 2001* (NCES 2001–072). Washington, D.C. Data from U.S. Department of Commerce, Bureau of the Census, October Current Population Surveys, various years.

qualified job candidates. A majority said this need extended from entry-level production workers to craft workers to operators and machinists. Thirty-two percent of the respondents said their workforce had poor reading and writing skills and about a quarter said their math, verbal communication and English language skills were not up to par. The study noted that the lack of an adequately skilled workforce could "drive a business, already operating on a competitive edge, out of the global game."

Taking Action: Preparing America's Future

The United States has been fortunate to have enjoyed success in the international marketplace even as far too many students leave high school with the most minor of accomplishments and less prepared for the world than students in many other countries with advanced economies.

Analysts who have carefully examined this issue believe the nation has fared as well as it has in recent years because of its size, the fluid character of its labor markets, and the ability of many firms to capitalize on both public and private investments in research and technology.

But other nations are not standing still, and there is no guarantee that today's advantages will be permanent. In time it is likely that others will learn from our example, as American firms learned valuable lessons from Japanese manufacturers in the 1980s. When that day comes, the quality of our human capital will be more important than ever. So while the nation has enjoyed great prosperity in the past decade in spite of the performance of our schools, our future rests on doing much better.

Such improvement depends in part on how well elementary and middle schools do their jobs. It depends on what happens to students during their preschool years and the kind of support they have at home. But it also depends on the quality of curriculum and instruction the high school provides, the environment it creates for learning, and the signals it sends students about what matters.

Some high school educators do a terrific job reaching young people whom others thought could not achieve. Yet, too many give up on certain students or hold others to the most modest of expectations. If schools that provide an excellent education for all their students are to become much more commonplace in cities and towns and villages across this nation, as they certainly must, then fundamental change in such attitudes and expectations and in policy and practice must be the order of the day.

No Child Left Behind was a first step to mobilize and inspire action in elementary and middle schools. If America's youth are to have a future with promise, the nation now needs to take similar bold and comprehensive action to reshape our high schools.

Endnotes

[1]University of Pennsylvania, National Center on the Educational Quality of the Workforce (1997). *1997 National Employer Survey, Phase II.* Philadelphia, Pa.: Author.

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[13]Ibid, p.1.

[14]Lewis, L., et al. (1996). *Remedial Education at Higher Education Institutions in Fall 1995* (NCES 97-584). U.S. Department of Education, NCES. Washington, D.C.

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For additional information on the Office of Vocational and Adult Education's efforts to strengthen high schools, community colleges and adult education, please visit http://www.ed.gov/offices/OVAE.

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